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UPPER-CLASS EMIGRATION.

WHAT shall we do with our sons?

The cry is loud and increasing, the query meets our eye in the daily papers, in the advertisements inserted by colonisation companies and by pamphleteers; it obtrudes itself in a very forcible manner upon the attention of many a paterfamilias of the upper and middle classes, who cannot afford to do more than give his sons a fair start in life, to sink or swim according to their characters or abilities.

Emigration amongst the lower classes has now been brought to a highly systematic point. Every line of steamers whose vessels leave an English port for foreign lands, has special arrangements in connection with it. Emigration offices are found in every considerable town in the United Kingdom, and full information about the colonies may be had for the asking at any of them—particularly from the Emigrants' Information Office, 31 Broadway, Westminster, S.W.

But public schoolboys wishing to go abroad, having hitherto been brought up in more or less comfort, find themselves at a loss on two points—where to go, and, having decided this—what to do when they get there. And let me say here, that it is infinitely better that the sons of our landowners, officers, and merchants should go out beyond the seas than add to the vast army of professional men, so steadily increasing and crowded to such an extent, that often a man has reached the prime of life before he finds himself earning a competent income.

There are fundamentally two outlets open to our youths, and it is between these that the choice must in every case be made; they are (1) the colonies or (2) foreign countries.

Take the colonies first. In almost all our possessions, competition has reached almost as high a point as it has at home. In Australia, Canada, and New Zealand, the artisan or skilled workman is infinitely better off than an educated young fellow without any particular

trade; we find scions of good English families as storekeepers or cattlemen on Australian stations and on the South African veldt, or journalists in Southern towns, eking out a bare livelihood by their pen. Many labour for a pittance under settlers of the old stamp, men socially and in point of education far their inferiors, but who came out when the colony was younger. The stronger by degrees work their way painfully upwards with almost as much difficulty as they would have had at home. The weaker take to gold-mining, drinking, smuggling, or worse, and go rapidly down to the pit of the lost.

The United States, especially Florida, California, and Dakota, all favoured portions of the great American Republic, are similarly inundated by our upper classes. Wheat-farming in Dakota, fruit-growing in California and Florida, are now very considerably developed—a few more years and these countries too will be included amongst the 'full up.' Where then can the young Englishman turn to?

There is, I would remind him, a certain part of the American continent which has hitherto never been seriously taken into consideration as affording an opening for small capitalists. It might be blotted out from the map, so little does it enter into calculation. From the Texas frontier southwards to the river Plate there lies a country some four thousand miles in length, a region which is one of the richest on earth. From Mexico to Uruguay lies a practically virgin world, containing boundless natural resources, and capable of turning out an El Dorado to the industrious pioneer.

Why these countries have been hitherto so much neglected it is easy to account for. Political turmoil, depreciated currencies, language, climate, &c., above all, ignorance as to the true conditions of life there—these are the chief drawbacks. But those who make inquiries will acquire astonishing information. There are Englishmen in South America, hard-working and enterprising Englishmen, who are exacting

from the soil its toll on both sides of the Andes, and making money, not through speculations in worthless Government bonds, but from wheat, sugar-cane, coffee, and other tropical produce. If these men do well in those far-off lands, the fringe of whose fertile wildernesses is barely touched, why should not others? Here at last there is scope.

The disadvantages which I mentioned above as being generally considered unfavourable to immigration, I will discuss briefly.

(a) Political revolutions, convulsing as they do each and all of the Spanish-American States, are nevertheless purely amongst the natives themselves. A European who does not interfere in politics—and if he is wise he will shun them as he would the Gorgon's head—is seldom molested if circumspect in his conduct. Of course in the interior, property is always more or less unsafe in time of civil riot; the authorities on the coast cannot in such a case control the far inland districts. Compensation, however, is obtainable through the British Consul if damage is proved to have resulted from political disturbances, in which the sufferer has taken no part; though I may say here, that in the Argentine Republic, where revolutions are chronic, it is a rare thing indeed for a European to suffer loss from this cause. When fools fight, wise men profit, and in countries where the energies of the citizens are devoted to local and general disturbance, the European on his lands out in the open country is monopolising agriculture and trade.

(b) Depreciated currencies. The River Plate paper-money is at a discount of from two hundred to two hundred and fifty per cent. Paraguayan paper is at a discount compared with Argentine paper at as much again, the gold premium there being from five hundred to seven hundred per cent. A young man going out to these States can afford to wait a few years till the premium on gold falls. And fall it most assuredly will as the territory becomes opened up; there is, indeed, a wide belief that it has already touched its highest point. Meanwhile, as he buys all he requires in the country itself, he finds the paper-money as good for his purpose in payment of wages and purchase of utensils as any bullion. And as he will, if a competent man of business, generally be a creditor of the country for so much paper, in the future, when paper rises, his assets will improve in value to a corresponding extent.

The most extraordinary ideas prevail even in these countries themselves as to the climate in different districts. In the towns on the sea-coast (all the towns of any importance are on the coast), the natives themselves have fearful tales to tell of the deadly climates up-country. 'You are going up to Jujuy!' your friends in Buenos Ayres exclaim in horror. 'You will die of malaria before three months. Jujuy is all swamp or desert.' On arriving at that remote Argentine province you find a bracing mountainous climate, unparalleled for enjoyable living for six months in the year. When at last the heat comes, with care in clothing and cooking you will ward off ague with no more

difficulty than you would a cold at home. True, in freshly cleared land it is often impossible to go free, but if taken in time these low fevers are easily got rid of. There are, undeniably, hot marshy valleys in all these tropical States most pestilential and deadly under present conditions; but all the republics enjoy great variety of climate, and on the mountain-slopes and tablelands of Brazil and Bolivia, Peru, Mexico, Ecuador, take which you will, the conditions of life are first class, and the temperature and soil adapted to every form of animal and vegetable growth.

'I cannot go to South America because I don't know Spanish,' say many. The Spanish and Portuguese languages are amongst the easiest to acquire. In three months a man of ordinary intelligence can make himself understood without difficulty—in a year he will be perfectly at home. Englishmen pride themselves on being execrable linguists, but why it should be so, does not appear. Schiller says that with every new learned tongue a man gets a new soul. Certainly the knowledge of Spanish and Portuguese is daily becoming of more practical use.

The course that I advise to the intending emigrant to South America is, for six months previously to take lessons in the language of the country to which he is going—Portuguese if to Brazil, Spanish if to any other part of the continent. A knowledge of chemistry, sufficient to enable him to analyse soils, will also be of great use. On reaching, say Pernambuco, or Guayaquil, or whatever port he may have selected, let him make inquiries as to the capabilities of the various provinces, and then arrange with some estate owner to teach him his business for a year or two—sugar-planting, coffee, cocoa, indigo, tobacco, chinchona, or anything else. Once having got an insight into the run of plantation work, he can either continue working for a wage, or if sufficiently affluent, set up at once for himself. Land is cheap, labour is cheap—in many parts it is Indian, and costs next to nothing. Land may be cleared at a third of what it would cost in the colonies; the ground once cleared yields large and valuable crops. Transport is not difficult, well-meaning railway companies having run lines through vast fertile plains and forests to end in some stagnant little town at the end of everywhere.

There is no doubt at all that for an ordinarily intelligent and robust youth there can be no comparison between his prospects as a tropical planter, and clerkdom or professional life in a crowded English city. One is a free life, large and full of opportunities—the other narrow, unhealthy because confined, a terrible struggle owing to competition.

I have purposely left unnoticed certain colonies belonging to this country which partake of a tropical character. The West Indian islands at the commencement of the century were so many gems in the British crown. Since the negro emancipation, they have steadily gone backwards, though why, it is not easy to see. Fertile, surrounded by the ocean, within a fortnight of London and a week of New York, surely there are great possibilities there. We are a race of colonisers—turn then to these

still new regions in the south-west, oh paternal families, and despatch your young hopeful to anywhere in America between Cancer and Capricorn.

THE MASTER CRAFTSMAN.*

CHAPTER XV.—IN THE HOUSE.

THEN followed the opening of the newly elected Commons. Our own member went off with a quiet air of self-reliance, not arrogance. 'I am not in the least afraid of my own powers,' he repeated. 'I have tried and proved them. I shall speak to the House first, and to the country next.'

So he went off, the strong man armed, to begin the fight; and we looked after him, as he strode down the street, for my own part always with the feeling that we had somehow changed places.

'Robert will get, I suppose, some day, the desire of his heart,' said Isabel. 'I wonder why men desire these things.'

'They are very grand things,' I told her. 'Robert wants to be a leader of men—is not that a great thing to desire? What greater thing can there be?'

'Yes, if he is fit for it, and if he be a wise leader. But Robert puts the leadership first and the wisdom next. He only desires the wisdom in order to get the leadership.'

'Nay, Isabel, we must think exactly the contrary. Otherwise, how is the world ever to respect the leader?'

'I cannot think anything except what I know.'

'Well, then. Power is a very great thing to have. Every man in the world, except myself, ought to desire power. I don't want it, I confess, because I am not ambitious. Perhaps that is philosophy. Give me a tranquil, an obscure life if you like, with private interests; boat-building, for instance—and—what it seems I shall have to forego.'

Isabel paid no heed to the latter sentence, but went on talking about Robert. 'Always to lead, always to command. That is Robert's single thought. If he was King, he would not be contented unless he ruled the whole world.'

'A noble ambition, truly.'

'Sometimes I wonder whether all the great men of history have been self-seekers as well as masterful.'

'I should say—all. The personal motives, desire of place and authority, must underlie everything else.'

'Then how can any woman love a man who thinks of nothing but himself? I could not, George; but you know it—you—I cannot.'

'Well, Isabel, a woman may love the greatness and strength of the man first of all. Besides, she may call that a noble ambition which you call self-seeking. She may call that tenacity which you call selfishness. She may lend her whole strength.' I thought of Frances and what she would do. 'To advance the career in which her husband is absorbed, without asking for thanks or recognition from him at all.'

'I could not do it, George. The thought of devotion without thanks or recognition makes me wretched. I could never love a man who would accept such work. Besides, I could never love a man unless I filled his heart, and made him think of me.'

So she spoke, telling me all her thoughts in sweet confidence, knowing that it would not be abused. Well, some women differ. Frances would be contented if only her husband became a great man, with neither thanks nor recognition. Isabel cared nothing about the greatness. And I suppose that some women are contented with the ideal they have set up; they love not the strong man for his strength, nor the weak man for his weakness; they love an imaginary man. In this way the noblest woman may love the lowest man, seeing her ideal even through the matted overgrowth of animalism. Isabel had no power, unfortunately, of setting up an ideal; in this case, she knew the real man in his workshop, without his coat, so to speak, in his shirt sleeves. I said so. 'You worked with him, and for him, Isabel. That destroyed the ideal. No man is a hero to his typewriter.'

For three weeks nothing happened. At the house we went on as usual, but without Robert, who remained at Westminster, living in my chambers, while I took over the work of his boat-yard all day and the care of his mistress every evening. We were loyal to him; there was passed between us no word or look of which one need be ashamed: Isabel had repeated her promise; she had renewed the oath; one could only wait.

One morning, however, I found a letter lying on my plate. It was from Frances. I opened it: a long letter. I laid it aside: with my second cup of tea I began to read it leisurely. But over the second page I jumped with interjections.

'MY DEAR GEORGE,' she began, 'I was in the House last night looking down upon the new lot. They seem to be rather a mixed lot. We have had losses. However, a good many of our old friends are back again, and the majority is assured and is large enough if the Whips do their duty. Alas! If my mother were still living, with her salon and her dinners, that majority would become a solid block, growing every day. I might, myself, have such a salon, if there was a man anywhere for whose sake I could take the trouble and make myself a leader. But, George, as you know very well, there is not.'

I laid down the note. I could see in imagination Frances writing these words. She would throw down the pen and spring to her feet in impatience—in queenly impatience because among all her subjects she could not find one man strong enough. Yet to one strong and ambitious she would give, not only herself, but also such help in his career as few, very few, men could hope for; the help of a very long purse, very great family influence, political experience, and social power. She wanted to find such a man; she desired above all things to be a political lady, the wife of a great political leader; she would exact from him in

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return for all she gave, nothing but devotion to his career; she would acquiesce in his working and thinking for no other object.

On the other side of the table sat the other type of woman; one who wanted nothing of life but love, with sufficiency and tranquillity; one who would be perfectly contented with a life in the shade, and with a perfectly obscure husband.

As for myself, it seemed then, and it seems now, as if no distinctions—which do not distinguish—were worth the struggle and conflict, the misrepresentation, the lies and slanders of the party contest. Whereas, to live in obscurity beside a babbling brook—on Wapping Old Stairs, for instance; or among thick woods—the burial-ground of St John's, Wapping, for instance; or in country lanes with high hedges on either side—say the High Street, Wapping; with love and Isabel. . . . I resumed the letter.

'The questions do really grow more tedious every day. At last the adjourned debate began again—at half-past nine. You never take interest in anything really interesting, my dear George, so that it is useless to tell you that the Bill was a Labour Bill, and that everybody thought it a very useful Bill—even the working-men Members until to-night. However, the Bill, everybody says, will now have to be abandoned. In other words, your cousin, in a single maiden speech, has done the Government the injury of making them withdraw a Bill. It is equivalent to a defeat. But I am anticipating. My dear George, your cousin's speech is talked of by everybody.'

'Where's the paper?' I cried. 'Give it to me, Captain.' I tore it open and looked at the debates. Yes, there it was! Robert had made his first speech. 'Look, Isabel!' I cried. 'Look! he has succeeded with a single speech.' I threw the paper across the table and went on reading.

'I daresay you will have seen all about it in the papers. Now it is very curious; I had almost forgotten that your cousin was a candidate. They told me that he had no chance whatever, and I left off thinking about him as a candidate. Of course I could not forget the fiery orator of Shadwell, or the hero of the splendid fight that I witnessed. So that when he got up to speak I was quite unprepared for him. Of course I remembered him instantly; he is not the kind of man one forgets readily. I think he is quite the handsomest man in the House; not the tallest, but what they used to call the properest man and the comeliest; he has not the least air of fashion, but he has the look of distinction.'

'Good,' said the Captain. 'I always said that he looked like a duke.'

'Read the speech, George,' said Isabel, 'and then go on with the letter.'

I read the speech aloud. The oblique narrative makes everything cold. Even in direct narrative one loses the voice—in this case so rich and musical a voice—and the aspect of the man, the personality of the speaker—in this case so marked and so distinguished. Now the House of Commons may be cold—how can that unhappy body, doomed to listen day after day to floods and cataracts of words, be any-

thing but cold?—but I was sure even from this dry 'précis' that the members must have listened with surprise and delight. The close of the speech I turned back from the oblique to direct narrative, and read it in the first person.

'Oh!' said Isabel. 'I think I hear him speaking. Those facts I copied for him myself from a blue-book.'

'Robert will be a great man,' said the Captain. 'My dear, they will make him something. He will be a nobleman and you will be my lady.'

'You read it just as Robert would speak it,' said Isabel. 'Your voice is like his, only not so strong. But you are like him in so many ways.'

'It is a noble speech, Isabel.'

'It is his first bid for power,' she distinguished. 'I daresay it is an able speech. But I feel as if I had been behind the scenes while he was preparing the show. To me, George, it will always be a show.'

'You are like the child who wants to go beyond the story, Isabel. Why not be contented with the things presented?'

I went on with the letter.

'I told you, George, in that East-End den, that the man was a born orator. He spoke better to-night, in the House, than before those working-men; perhaps because he was more careful. He is one of those speakers, I mean, with whom repression increases strength. He spoke consciously, I am sure, to the country as well as to the House. His voice is magnetic in its richness and fulness; his periods are balanced; he spoke without the least hesitation, yet without the fatal fluency; he was not embarrassed; he spoke with authority. The effect of his speech upon the House was wonderful; the members were dominated. They listened—compelled to listen. When he sat down there was a universal gasp, not of relief, but of astonishment.'

'Of course I do not know what your cousin means or wishes by going into the House. Probably nothing but a vague ambition. What should such a man understand of the political career? Yet, when I say "such a man," I think of his trade, not of his appearance or his manner. He looks like a king and has the manners—in the House at least, whatever he might have in society—of one accustomed to the best people. Come and talk to me about him.'

'Of course, also, one must never judge by a first speech. It is always interesting to hear the maiden effort. Very likely your cousin prepared every phrase and every word of it, and he would break down in debate. I wait for his second speech, and for a speech in reply.'

'The member for Shadwell, as I told you before, is absurdly like you in face and in general appearance, but he is a bigger man. Perhaps he resembles the Judge, who was a very big man, more than you. Well, George, for your sake I shall watch his movements and read his speeches. He may do something considerable; he may not. Many a man makes a good beginning in the House who cannot

keep it up. The floor is knee-deep with the dust and bones of dead and gone ambitions. They take the place of the rushes which they formerly strewed on the floor. I was looking at the faces of the members last night. There were the old stagers who have long since parted with their ambitions, and now sit quiet and resigned, and vote like sheep. Why do they do it? What is the joy of remaining all their lives among the rank and file? Then I saw the faces of the new young men. I made them all out, one after the other, those who are ambitious and those who are not. Oh! George, what an interesting place the House of Commons is, and why—why—why have you left to a tradesman cousin all the ambition in the family?

I read all this aloud.

'Who is your correspondent, George?' Isabel asked. 'I suppose it is your friend, Lady Frances. Why is she so contemptuous about tradesmen?'

'She only thinks that I ought to have gone into the House, Isabel. It is her way of expressing herself.'

However, the rest I did not read aloud.

'You may bring your cousin to see me, George. I am at home this day week. You so seldom come over to see me that I am almost tempted to come over to Wapping. But it would be too dreadful to see you among the chips, with your coat off and your sleeves turned up, and an apron, and, I daresay, disfiguring callosities already on your hands. When you are sick and tired of it, come back to the world. Lord Caerleon will soon want a private secretary. The post would suit you entirely. He is a man of the world—not a politician only. And there are still things to be had worth the having, and in the gift of ministers, which are not awarded by competitive examination to candidates who certainly have no more merit than you yourself. Come back. Great donkey—it is dull without you.—Your affectionate sister—by adoption, FRANCES.'

(To be continued.)

A CHAPTER ON HOUSE-FLIES.

At certain seasons of the year very few of our dwelling-houses are free from the presence of flies; they force themselves upon our notice in various ways, either by reason of their perpetual buzzing upon our window-panes, by their monotonous hum as they fly ceaselessly to and fro in our rooms, by their continual presence, both living and dead, wherever there is food of any kind, or lastly, by their persistent and irritating attention to our own persons. It is not generally known, however, that there are several different species of flies which thus torment us, and therefore it may profit us to consider for a little time, in a very elementary way, a few of the more conspicuous kinds, pointing out how one kind differs from another, not only in appearance and structure, but also in habits of life.

It is desirable, perhaps, to take as our first example the species which is properly entitled to the popular name of 'Common House-fly'

—that known to scientific men as *Musca domestica*. Before describing this little creature, however, we should like to draw our readers' attention to what seems to be a rather prevalent popular error—namely, the idea that flies grow, in the ordinary sense of the term, and that the size of any fly we see upon the window-pane merely depends upon its age. Nothing could be further from the mark, for when a fly once becomes a fly—in other words, when it escapes from the pupa-case and acquires the use of wings, its development is completed and all power of growth at an end. It follows, then, that where there is a marked difference of size between two flies, we may be tolerably certain that they belong to quite distinct species.

It is not our purpose to go minutely into the structure, either external or internal, of flies, but it may be useful to mention that the great characteristic of all insects belonging to the Diptera, as the order of flies is called, marking them off from all other insects, is the possession of only one pair of wings. The second pair of wings, found in butterflies, moths, beetles, &c., is here represented by a pair of small balancers, called halteres, which are attached to the body, one on each side, just behind the true wings, and which in shape resemble a pair of miniature drum-sticks.

In its general appearance the common house-fly is very sombrelly dressed, and seems to be without adornment of any kind, but on a closer examination it will be seen that it is really quite an elegantly marked insect. When seen from above, against the light, the front of the head is seen to glisten with two resplendent silvery-yellow patches, the thorax or middle part of the body between the wings is elegantly striped, while the abdomen or hinder part is beautifully checkered with yellow and black. The wings are transparent and tinged with gray, with a most brilliant and beautiful iridescence in certain lights. All these points give to the little creature a beauty of its own, entirely lost to the majority of people, merely because the insect is a common and insignificant one, and seemingly not worth the trouble of examining.

On holding up the fly to the light so as to look through the wing, it will be seen by the aid of a magnifying glass that there are a number of almost parallel veins running through the wing from base to apex, and that these are connected by short cross-veins. The fourth of these parallel veins, counting from the fore margin of the wing, is seen to be bent upwards at an obtuse angle towards the third, and this is really an important character and an easy one by which to distinguish this particular kind of house-fly from some others which are equally common and similar in size and appearance, but which have this vein quite straight. The head of our fly is a very pretty object. The greater part is occupied by two large reddish-brown hemispheres, one on each side. These are the compound eyes, and each of them consists of several thousand separate hexagonal lenses, arranged so as to cause an appearance under the microscope like the engine-turning on the back of a watch. Between

these compound eyes, and quite on the top of the head, are a trio of small clear dots, arranged in a triangle, like set jewels. These are the simple eyes, and their exact purpose does not seem to be thoroughly understood. In front of the head are the antennæ or feelers, and each consists of three joints, with a feathered bristle arising from the back of the last joint. This bristle is an important aid in the identification of the different species of flies, in some kinds being quite simple, in others beautifully plumose or feathered, as in the common species now occupying our attention. Below the head of the fly may be seen projecting the long thick tongue or proboscis, which is a very wonderful structure. We have only space to say a very little about this organ; to describe it fully would occupy more than the whole space devoted to our present article. It is a true sucker, but a very complicated one, made up of several pieces united so as to form a tube, which not only serves for the conveyance of the fluid food to the mouth, but also for the passage of saliva from the mouth in order to moisten and dissolve particles of the substance upon which the fly is feeding. At the tip of the proboscis are to be found hardened rings which aid in triturating the food. We have already described the general appearance of the body of the fly, so that it only remains for us to say a word or two about the legs. As in other insects there are six legs, each consisting of several joints. The foot is composed of five separate joints, the last of which is terminated by a pair of curved claws. Between the claws is a pair of minute pads, generally supposed to act as suckers. It is by the aid of these pads that flies are enabled to climb the smooth window-pane, or walk along the ceiling. Whether these pads act merely as suckers, or whether in addition they secrete a sticky substance to aid the fly in its vertical peregrinations, has not been satisfactorily proved. We cannot, however, place much faith in the latter theory.

The eggs of the common house-fly are generally laid in dung, but almost any kind of dirt or filth may be appropriated by the female for this purpose. An important factor, therefore, in the extermination or at least the diminution in numbers of these pests would seem to be absolute cleanliness in our rooms and kitchens, and the prevention of any accumulation of dust. From the eggs are hatched small, whitish, footless grubs, which feed on the filth amongst which they live, soon becoming pupæ enclosed in a hard skin. When the fly is ready to emerge, its head is furnished with a large protuberance, filled with fluid, with which it forces off the lid of the case. When the fly first escapes, its wings are in quite a crumpled condition, and this circumstance, combined with its enormously swollen head, gives the insect a very grotesque appearance. In a very few minutes, however, the wings become fully expanded, and at the same time the head shrinks and the fluid is withdrawn, the whole body hardens and changes colour, and the fly is perfect.

Of the other kinds of house-flies very little need be said. There is a smaller kind, liable to be mistaken for the *Musca domestica*, but

which has the fourth vein of the wing straight. The abdomen has the base at each side yellow and transparent, while the front of the head is brilliant silvery white, with the eyes almost meeting, at least in the male, at the top of the head. This fly rejoices in the name of *Homalomyia canicularis*, though it used to be called *Musca domestica minor*. So we, too, might quite legitimately call it the 'smaller house-fly.' It has a similar life-history to that of its larger relative, with the exception that the eggs are laid in decaying vegetable matter.

A third kind of house-fly, and the only one that really 'bites' or 'stings,' is distinguished by having its weapon of offence, the proboscis, sticking straight out horizontally in front of its head. Moreover, the fourth vein of the wings is gently curved towards the third, and neither straight, as in the 'smaller,' nor bent at an angle, as in the 'common' house-fly. On the whole, it is a more prettily marked insect than either of the others, though its beauty hardly compensates us for its vicious habits. It is a veritable blood-sucker, attacking our hands and faces, and well merits both its popular and scientific name—the 'sharp-mouthed stinger,' or *Stomoxys calcitrans*. Its thorax is similarly striped to that of the common house-fly, but the abdomen is very differently adorned, being yellowish-gray, with six black dots, three on the second ring and three on the third. Its life-history is similar to that of the common house-fly.

Quite different both in habits and appearance from all these flies is the common Blue-bottle, called scientifically *Calliphora erythrocephala*. This is almost too well known to need description. It is a much larger insect, of a beautiful metallic blue colour, with a sheen which changes its position as we turn the fly about in various lights. The front of the head on its lower part is of a reddish colour, and the fourth vein of the wings, so often alluded to, is bent at a very sharp angle towards the third. The eggs of the bluebottle are laid in flesh of different kinds, and every housewife knows the difficulty in summer and autumn of keeping these unwelcome visitors away from her choicest viands. Even living wounds have been selected by these flies for the purpose of depositing their eggs, and great must be the agony caused by the maggots which hatch from them. The maggots are ready to escape from the egg in a very few hours after these have been laid, and themselves soon enter the next or pupal stage. As to the duration of life of the perfect fly, it is probably much longer than that of either the larva or pupa, and some bluebottles may even hibernate through the winter, and so live on from one year to the next.

The last fly we shall notice, though not so often found in houses as the others, yet possesses an interest from its habits. This is the common Flesh-fly, *Sarcophaga carnaria*. It is about the size of the bluebottle, but of a more slender build, of a gray colour, and perhaps the most handsome fly we have considered. The face is silvery, the veins in the wings are similar in arrangement to those of the bluebottle, the thorax is beautifully striped, alter-

nately black and gray, while the abdomen is brilliantly checkered with black and silvery gray. The females of this fly are viviparous, that is to say, they do not lay eggs, but living larvae. These are deposited upon all sorts of animal matter, and in countless numbers. Meigen, a great authority on the Diptera in the earlier half of the present century, has calculated that, supposing a female to lay only fifty eggs, which is a very small estimate, say on the 1st of April, and that half of these become females and lay fifty eggs each, by the end of October, at the same reckoning, would be produced from this single fly a progeny of no less than five hundred and eight millions of separate individuals. By allowing eighty eggs to each female this number would amount to as many as eight thousand millions. So that, to use Meigen's own words, had not Nature provided ample means for their extermination, more especially in the shape of insectivorous birds, this host would indeed leave little meat for man, and *fast-days would prevail!*

THE MAHALAPSI DIAMOND.

CHAPTER IV.—CONCLUSION.

AGAIN, as usual in Kimberley at this season, the next morning broke clear and invigorating. All the world of the corrugated-iron city seemed, after breakfast, brisk, keen, and full of life as they went about their business. The Cape swallows flitted, and hawked, and played hither and thither in the bright atmosphere, or sat, looking sharply about them, upon the telegraph wires or housetops, preening their feathers and displaying their handsome, chestnut body colouring. The great market square was still full of wagons, and long spans of oxen, and of native people, drawn from well-nigh every quarter of Southern Africa.

Out there in the sunlit market-place stood a man, whose strong brain was just now busily engaged in piecing together and puzzling out the patchwork of this extraordinary case. David Ayling, with his mighty voice, Scotch accent, oak-like frame, keen gray eyes, and vast iron-gray beard, was a periodical and excellently well-known Kimberley visitant. For years he had traded and hunted in the far interior. His reputation for courage, resource, and fair dealing was familiar to all men, and David's name had for years been a household word from the Cape to the Zambesi. Periodically, the trader came down to Kimberley with his wagons and outfit, after a year or two spent in the distant interior. Yesterday morning he had come in, and in the afternoon and evening he seemed to hear upon men's tongues nothing else than Frank Farnborough's case, and the story of the Mahalapsi diamond. Now David had known Frank for some few years, and had taken a liking to him. Several times he had brought down-country small collections of skins, and trophies of the chase, got together at the young man's suggestion. He had in his wagon, even now, some new and rare birds from the far-off Zambesi lands, and the two had had many a deal together. Frank's un-

happy plight at once took hold of the trader's sympathies, and the Mahalapsi and crocodile episodes tended yet further to excite his interest. Certain suspicions had been growing in his mind. This morning, before breakfast, he had carefully read and re-read the newspaper report of the trial, and now, just before the court opened, he was waiting impatiently with further developments busily evolving in his brain. There was a bigger crowd even than yesterday; the prisoner and counsel had come in; all waited anxiously for the end of the drama. In a few minutes the court entered, grave and self-possessed, and the leading judge began to arrange his notes.

At that moment, David Ayling, who had shouldered his way to the fore, stood up and addressed the court in his tremendous deep-chested tones, which penetrated easily to every corner of the chamber.

'My lords,' he said, 'before you proceed further, I should like to lay one or two facts before you—not yet known in this case. They are very important, and I think you should hear them in order that justice may be done, and perhaps an innocent man saved. I have only just come from the Zambesi and never heard of this trial till late yesterday afternoon.'

Two persons, as they listened to these words and looked at the strong, determined man uttering them, felt, they knew not why, instantly braced and strengthened, as if by a mighty tonic. They were Frank, the prisoner, hitherto despairing and out of heart, and Nina Staarbrucker, sitting at the back of the court, pale and trembling with miserable anticipations.

'You know me, my lord, I think,' went on David, in his deep Scotch voice.

'Yes, Mr Ayling, we know you, of course,' answered the senior judge (every one in Kimberley knew David Ayling), 'and I am, with my colleagues, anxious to get at all the evidence available before completing the case. This is somewhat irregular, but, upon the whole, I think you had better be sworn and state what you have to say.'

David went to the witness-box and was sworn. 'This crocodile skin here,' he went on, pointing to the skin, which was handed up to him, 'I happen to know very well. I have examined it carefully before your lordship came in; it is small, and of rather peculiar shape, especially about the head. I remember that skin well, and can swear to it; there are not many like it knocking about. That skin was put on to my wagon in Kimberley seventeen months ago, and was carried by me to the Mahalapsi River.'

The court had become intensely interested as the trader spoke, the judges and magistrate pricked up their ears and looked intently, first at the skin, then at David.

'Go on,' said the judge.

'Well, my lord,' resumed David, 'the skin was put on to my wagon in February of last year, by Sam Vestheim, a Jew storekeeper, in a small way in Beaconsfield. There were some other odds and ends put on the wagon, little lots of goods, which I delivered in Barkly West. But the crocodile skin, Sam Vestheim said, was a bit of a curio, and he particularly

wanted it left at some friend's place farther up-country. I was in a hurry at the time, and forgot to take the name, but Sam said there was a label on the skin. The thing was pitched in with a lot of other stuff, and lay there for a long time. I lost sight of it till we had got to the Mahalapsi River, where the wagon was overturned in crossing. I off-loaded, and the crocodile skin then turned up with the label off. We were heavily laden; the skin was, I thought, useless; we were going on to the Zambesi, and I had clean forgotten where the skin ought to have been left. It seemed a useless bit of gear, so I just pitched it away in the bushes, in the very spot as near as I can make it, where Mr Farnborough's friend, Mr Kentburn, found it, nearly a year later, as he came down-country. That is one remarkable thing. I would like to add, my lord, that the Mahalapsi is a dry river, never running except in rains; and in all my experience, and I have passed it some scores of times, I never knew a crocodile up in that neighbourhood. The chances of there being any other crocodile skin in that sandy place and among those bushes, where Mr Kentburn found this one, would, I reckon, be something like a million (David pronounced it *mullion*) to one.

'There is one other point, my lords. Long after Sam Vestheim delivered that skin on my wagon, I read in the newspapers that he had been arrested for I.D.B.—only a few weeks after I saw him—and sentenced to a term of imprisonment. I have been puzzling mightily over this case, and I must say, the more I think of it, the more unaccountable seems to me the fact of Sam Vestheim sending that dried crocodile skin up-country. If it had been down-country, or to England, I could understand it; but in this case it seems very much like sending coals to Newcastle. I never knew that Sam was in the I.D.B. trade till I saw his imprisonment in the paper. I think he had some peculiar object in getting that skin out of his house. And I cannot help thinking, my lord, that Sam Vestheim, if he could be found, could throw a good deal of light on this crocodile and diamond business. In fact, I'm sure of it. It's quite on the cards, to my thinking, that he put the diamond in that crocodile himself.'

Some questions were put to the witness by counsel for both sides, without adding to or detracting from the narrative in any way. The court seemed a good deal impressed by David's story, as indeed did the whole of the crowded audience, who had breathlessly listened to its recital. Mr Flecknoe, the detective, was called forward. He informed the court that Sam Vestheim was now at Capetown undergoing a long term of imprisonment. He was no doubt at work on the Breakwater.

The senior judge was a man of decision, and he had quickly made up his mind. After a short whispered consultation with his colleagues, he spoke. 'The turn this case has taken is so singular, and the evidence given by Mr Ayling has imported so new an aspect, that in the prisoner's interest we are determined to have the matter sifted to the bottom. I will adjourn the court for a week, in order to secure the

convict Vestheim's attendance here upon oath. Will this day week suit the convenience of all counsel in this case?'

Counsel intimated that the day of adjournment met their views, and once more the crowded court emptied. As David Ayling turned to leave, he caught Frank Farnborough's eye. He gave him a bright reassuring nod, and a wink which did him a world of good. Altogether Frank went back to another weary week's confinement in far better spirits than he had been for many days. There was, at all events, some slight element of hope and explanation now. And it was refreshing to him as a draught of wine, to find such a friend as David Ayling fighting his battle so stoutly, so unexpectedly.

Nina Staarbrucker stole silently out of the court, only anxious to get home, and escape observation. There were many eyes upon her, but she heeded them not at all. Thank God! there seemed some ray of light for Frank; for herself, whether Frank came out triumphantly or no, there was no outlook, all seemed blackness and gloom. Otto's part in this wretched business had made ruin of all her hopes. Her brother's treachery had determined her upon seeking a career of her own—work of some sort—anywhere away from Kimberley she must get, and get at once, so soon as the trial was over, and whatever its result.

Once more, in a week's time, the court wore its former aspect, the characters were all marshalled for the final act. The new addition to the caste, Mr Samuel Vestheim, a lively, little, dark-visaged Jew of low type, seemed on the best of terms with himself. For more than fifteen months he had been hard at it on Capetown Breakwater, or road-scarping upon the breezy heights round the Cape peninsula—always, of course, under the escort of guards and the unpleasing supervision of loaded rifles—and really he needed a little rest and change. This trip to Kimberley was the very thing for him. What slight sense of shame he had ever had, had long since vanished under his recent hardening experiences; and as the little man looked round the crowded court, he saw the well-remembered faces of many a Kimberley acquaintance, and it did his heart good. He positively beamed again—in a properly subdued manner, of course.

The leading judge remarked to the advocates, 'Perhaps it will save the time of all if I put some questions to this witness myself.' The suggestion was gracefully received, and the judge turned to the little Jew, now attentive in the witness-box.

'Samuel, or Sam Vestheim, you are a convict now undergoing a term of penal servitude at Capetown, I think?'

'Yeth, my lord.'

'It may perhaps tend slightly to lessen or mitigate the extreme term of your imprisonment if I receive perfectly truthful and straightforward answers to the questions I am going to ask. Be very careful, therefore. Any future recommendation on my part to the authorities will depend upon yourself.'

'Yeth, my lord,' answered Sam, in his most serious manner—and he meant it.

'About seventeen months ago you were in business in Beaconsfield, were you not?'

'Yeth, my lord.'

'Do you know Mr Ayling here?' pointing to the trader.

'I do, my lord.'

'Do you remember entrusting Mr Ayling with some goods about that time to take up-country?'

'I do, my lord.'

'What were they?'

'There were three cases of groceries to be delivered in Barkly West, and a crocodile skin to be left at the place of a friend of mine near Zeerust, in Marico, Transvaal.'

'Take that skin in your hands.' The crocodile was handed up like a baby. 'Do you recognise it?'

'Yeth, my lord, that is the identical skin, I believe, that I handed to Mr Ayling.'

'Now, be careful. Was there anything inside that crocodile skin?'

The little Jew saw now exactly which way the cat jumped, and he saw, too, that only the truth could be of use to him in the weary days and years yet to come on Capetown Breakwater. The court was hushed by this time to an absolute silence. You could have heard almost a feather fall.

'Well, my lord,' the little Jew replied, 'there *was* something inside that crocodile. I had had a little bit of a speculation, and there was a big diamond inside the crocodile skin. I put it there myself. You see, my lord,' he went on rapidly, 'I had been doing one or two little transactions in stones, and I fancied there was something in the air, and so I put away that diamond and packed it off in the crocodile skin, safe, as I thought, to a friend in the Transvaal. It was a risk, but just at that time it was the only way out of the difficulty. I meant to have had an eye on the skin again, myself, a few days after, but I had a little difficulty with the police and I was prevented.'

As Sam Vesthrein finished, Frank could have almost hugged him for the news he brought. An irrepressible murmur of relief ran round the crowded court, a murmur that the usher was for a minute or two powerless to prevent. The judge whispered to an attendant. The diamond was produced and handed to the Jew. 'Do you recognise that stone?' said the judge.

'I do, my lord,' answered Vesthrein emphatically. 'That is the stone I put inside the crocodile. I could swear to it among a thousand.' The little man's eyes gleamed pleasantly yet regretfully upon the gem as he spoke.

Here, then, was the mystery of the fatal, puzzling diamond cleared up. There were few more questions to ask. The little Jew frankly admitted that the stone was a De Beer's stone, stolen by a native worker; there was little else to learn. Frank was a free man, practically, as he stood there, jaded and worn, yet at least triumphant. It was a dear triumph though, only snatched from disaster by the merest chance in the world—the coming of David Ayling. And the tortures, the agonies he had

suffered in these last few weeks of suspense! He knew that nothing—the kindly congratulations of friends, the tenderer affection of relations, the hearty welcome of a well-nigh lost world—none of these good things could ever quite repay him, ever restore to him what he had lost.

In a very few minutes Frank had been discharged from custody. The judges in brief, sympathetic speeches, congratulated him on his triumphant issue from a very terrible ordeal, and trusted that the applause and increased respect of his fellow-citizens would in some slight degree make up to him for his undoubted sufferings.

Frank left the court, arm in arm with David Ayling, whom he could not sufficiently thank for his timely and strenuous assistance. A troop of friends escorted him to the Transvaal Hotel, where his health was drunk in the hearty Kimberley way with innumerable congratulations. All this was very gratifying, as was the magnificent dinner which a number of friends gave to him a day or two later, at which half Kimberley assisted. But, for the present, Frank desired only to be left severely alone, with the quieter greetings of his few most intimate friends. He was still half stunned and very unwell; some weeks or months must elapse before he should be himself again.

One of his first inquiries was after Nina Staarbrucker, whom he wished sincerely to thank for her brave and honest defence of him at the trial. He learned, with a good deal of surprise, that she had left Kimberley on the morning after the trial, alone. He learned too, with less surprise, that Otto had quitted the town on urgent business in the Transvaal, and was not likely to return for some time. Beyond these bare facts, he could gather little or nothing of Nina and her whereabouts. He rather suspected she had gone to some relations near Capetown, but for the present her address was undiscoverable.

Very shortly after the result of the trial, Frank Farnborough was granted by his company six months' leave of absence, with full pay in the meantime. It was felt that the young man had been injured cruelly by his imprisonment, and that some atonement was due to him; and the Great Diamond Company he served, not to be behind in the generous shake of the hand, which all Kimberley was now anxious to extend to a hardly used man, was not slow in giving practical manifestation of a public sympathy. The stolen stone had been proved a De Beer's diamond, and Frank, its unfortunate temporary owner, had not only been deprived of a valuable find, but for his innocent ownership had suffered terribly in a way which no honest man could ever possibly forget. In addition, therefore, to his grant of leave of absence and full salary, Frank was handed a cheque for five hundred pounds, being, roughly, a half share of the value of the recovered gem.

Frank at once set out upon an expedition on which he had long fixed his mind—a hunting trip to the far interior. His preparations were soon made, and, a few weeks later,

he was enjoying his fill of sport and adventure in the wild country north-east of the Transvaal, at that time a veldt swarming with great game.

After three months came the rains, and with the rains, fever—fever, too, of a very dangerous type. Frank turned his wagon for the Limpopo River, and, still battling with the pestilence, kept up his shooting so long as he had strength. At last came a time when his drugs were conquered, the fever held him in a death-like grip, and he lay in his kartel gaunt, emaciated, weak, almost in the last stage of the disease. The fever had beaten him, and he turned his face southward and trekked for civilisation.

The wagons—he had a friendly trader with him by this time—had crossed the Limpopo and outspanned one hot evening in a tiny Boer village, the most remote of the rude frontier settlements of the Transvaal Republic. Frank, now in a state of collapse, was lifted from his wagon and carried into the back room of the only store in the place—a rude wattle and daub shanty thatched with grass. He was delirious, and lay in high fever all that night. In the morning he seemed a trifle better, but not sensible of those about him. At twelve o'clock he was once more fast in the clutches of raging fever; his temperature ran up alarmingly; he rambled wildly in his talk; at this rate it seemed that life could not long support itself in so enfeebled a frame.

Towards sundown, the fever had left him again; he lay in a state of absolute exhaustion, and presently fell into a gentle sleep. The trader, who had tended him day and night for a week, now absolutely wearied out, sought his own wagon and went to sleep. The store-keeper had retired, only a young woman, passing through the place, a governess on her way to some Dutchman's farm, watched by the sick man's bed.

It was about an hour after midnight, the African dawn had not yet come, but the solitary candle shed a fainter light; a cock crew, the air seemed to become suddenly more chill. The woman rose from her chair, fetched a light kaross* from the store, and spread it gently over the sick man's bed. Then she lifted his head—it was a heavy task—and administered some brandy and beef-tea. Again the young man slept, or lay in torpor. Presently the girl took his hand in her right, then sitting close to his bedside she, with her left, gently stroked his brow and hair. A sob escaped her. She kissed the listless, wasted hand; then with a little cry she half rose, bent herself softly and kissed tenderly, several times, the brow and the hollow, wasted cheek of the fever-stricken man. As she did so, tears escaped from her eyes and fell gently, all unheeded, upon Frank's face and pillow.

'Oh, my love, my love!' cried the girl, in a sobbing whisper, 'to think that never again can I speak to you, take your hand in mine! To think that I, who would have died for you, am now ashamed as I touch you—ashamed for the vile wrong that was done to you in those miserable days. My love, my darling, I must

now kiss you like a thief. Our ways are apart, and the journey—my God—is so long.'

Once more, leaning over the still figure, she kissed Frank's brow, and then, relapsing into her chair, cried silently for a while—a spasmodic sob now and again evincing the bitter struggle within her. The cold gray of morning came, and still she sat by the bedside, watching intently, unweariedly, each change of the sick man's position, every flicker of the tired eyes.

During the long hours of the two next days, Frank lay for the most part in a torpor of weakness. The fever had left him; it was now a struggle between death and the balance of strength left to a vigorous constitution after such a bout. Save for an hour or so at a time, Nina had never left his side. Hers was the gentle hand that cooled the pillows, shifted the cotton Kaffir blankets that formed the bedding, gave the required nourishment, and administered the medicine. On the evening of the fourth day, there were faint symptoms of recovery; the weakened man seemed visibly stronger. Once or twice he had feebly opened his eyes and looked about him—apparently without recognition of those at hand.

It was in the middle of this night that Frank really became conscious. He had taken some nourishment, and after long lying in a state betwixt sleep and stupor, he awoke to feel a tender stroking of his hand. Presently his brow was touched lightly by soft lips. It reminded him of his mother in years gone by. Frank was much too weak to be surprised at anything, but he opened his eyes and looked about him. It was not his mother's face that he saw, as he had dreamily half expected, but the face of one he had come to know almost as well.

Close by him stood Nina Staarbrucker, much more worn, much graver, much changed from the sweet, merry, piquant girl he had known so well at Kimberley. But the dark friendly eyes—very loving, yet sad and beseeching, it seemed to him dimly—of the lost days, were still there for him.

Frank opened his parched lips and in a husky voice whispered, 'Nina!'

'Yes,' said the sweet, clear voice he remembered so well, 'I am here, nursing you. You must not talk. No, not a word,' as he essayed to speak again, 'or you will undo all the good that has been done. Rest, my darling (I can't help saying it,' she said to herself; 'it will do no harm, and he will never hear it again from my lips); sleep again, and you will soon be stronger.'

Frank was still supremely weak, and the very presence of the girl seemed to bring peace and repose to his senses. He smiled—closed his eyes again, and slept soundly far into the next day.

That was the last he ever saw of Nina Staarbrucker. She had vanished, and although Frank, as he grew from convalescence to strength, made many inquiries as the months went by, he could never succeed in gaining satisfactory tidings of her. He once heard that she had been seen in Delagoa Bay, that was all. Whether in the years to come they will

* A fur cloak or rug.

ever meet again, time and the fates alone can say. It seems scarcely probable. Africa is vast, and nurses safely within her bosom the secret of many a lost career.

THE MONTH:

SCIENCE AND ARTS.

WHAT has been rather inaptly called the New Photography has had some curious developments during the past few weeks. It has been found by Mr Herbert Jackson, of King's College, London, that by using a Crooke's tube of particular form with a reflector of platinum supported in its centre, the X-rays can be brought, as it were, to a focus, or perhaps it would be more correct to say that the shadow picture afforded by such a tube is much better defined than with the apparatus formerly employed. It is also an important feature that the time necessary for taking one of these shadow pictures is, with this new tube, reduced from about twenty minutes to two. It is evident that this reduction in the time of exposure will make this system available for many surgical purposes.

Another curious development of the X-ray marvel has been found in the fact that, by using a screen coated with a certain fluorescent compound, the shadow pictures need not be submitted to the action of a photographic plate, but can be seen by the eye direct. Professor Salvioni, of Perugia, was the first to point this out, and experiments in London have corroborated his observations. By using a screen covered with potassic-platino-cyanide, Mr Herbert Jackson has shown that the bones of the hand, foot, elbow, &c. can not only be seen, but can actually be seen in movement. The method he adopts is to place the object to be viewed between the radiant matter tube and the fluorescent screen in a dark room; the shadow then becomes evident on the screen as a shadow might be projected upon a surface covered with luminous paint. In this way Mr Jackson has already viewed the spinal bones in a living human body, and he looks forward, at an early date, to viewing in the same manner the entire skeleton.

From observations made at some ironworks in Germany, it seems evident that the chimney of a blast-furnace, while such a furnace is in action, needs no protection by a lightning-conductor. Even if it be furnished with that metallic tie between the clouds and the earth, the electricity will prefer to avoid it, and to take advantage of the easier path afforded by the heated air. Again and again has it been noted at these works that the lightning will take a path right through the chimney shaft and through the molten metal to the earth beneath without doing any damage whatever. The explanation may be found in the circumstance that the column of smoke proceeding from such a chimney contains much water and carbon dust in suspension, and that this smoke, extending as it does to a great height above the chimney shaft, forms a far better conductor than the small copper tape outside the brickwork.

Dr John Murray, of the *Challenger* Expedition,

recently gave a very interesting lecture at the Royal Institution on Marine Organisms. He showed that temperature was a far more important factor in the distribution of these lower organisms than in the case of warm-blooded and air-breathing animals on *terra firma*. The surface waters of the ocean had five well-marked temperature areas. First, there were the Arctic and Antarctic regions with very low temperatures; next, a tropical belt of small range but with high temperature; and there remained two intermediate areas where the annual ranges of temperature were great. The ocean might be divided into two great divisions, the upper one reaching to a depth of one hundred fathoms, and the lower one, a still region where plants were absent, but where animal life was abundant. The lecturer supposed that the various facts in the distribution of marine organisms might be explained by supposing that in early geological times there was not only a uniform climate over the entire globe, but an almost universal fauna and flora.

A French process for giving to iron a rustless coating is carried out in the following manner. The article to be treated is placed in a gas retort, and raised to a temperature of about six hundred degrees centigrade, when a current of hydrogen is turned into the retort for forty-five minutes, after which a small quantity of naphtha is introduced for ten minutes. The hydrogen charge is now repeated for another fifteen minutes, and the process is complete. The effect of this treatment is to give the iron a bluish coating of carbide, which, it is said, is so strongly adherent to the metal, that it can be freely bent about without any disturbance of the rustless coat.

Several serious accidents have been recorded from flywheels, while revolving at a high speed, breaking into fragments and spreading death and destruction on every side; a result brought about by the centrifugal force exerted by the revolving mass overcoming its tensile strength. A new kind of flywheel has lately been erected at the Mannesman Tube Company's Works in Germany, which is specially designed to run at very high speeds without risk of such a disaster as that just referred to. The new wheel has a massive cast-iron hub or boss, to either side of which is strongly bolted a disc about twenty feet in diameter. The arrangement thus represents a huge but very narrow reel in proportion to its diameter. The space between the discs is wound with no less than seventy tons of steel wire, which has a tensile strength far beyond that possessed by any casting. This immense mass of metal is driven at a speed of two hundred and forty revolutions per minute, which gives a velocity to any point on its rim of about two and a half miles a minute, that is to say, about three times the speed of an express train. The wire employed in this novel form of flywheel is No. 5, and its estimated length is two hundred and fifty miles.

Edison's beautiful optical instrument, the Kinetoscope, has now become familiar to most people through its exhibition in various large towns. By means of it, a photograph, or rather a series of photographs, constitutes a marvellous

living picture, and the only drawback to the effect produced is the very small scale of the pictures. It has therefore been the endeavour of many inventors to adapt the mechanism of the Kinetoscope to the optical or magic lantern, so that the original pictures, which are not more than one inch in length, can be magnified to several feet. This has been done with more or less success by M.M. Lumière of Paris, and the apparatus is now being exhibited in London. What we may call the action of the pictures thus exhibited is most realistic. In one instance, a busy railway station is shown, a train is seen approaching, it draws up at the platform, the carriage-doors open, the passengers alight and talk with one another, and the guard steps forward and signals the engine-driver to proceed on his journey. It is evident that this apparatus when perfected will be as much valued by artists as a means of studying motion, as it is by mere amusement-seekers; but the assertion that one day we shall be able, by means of these projected pictures in association with the phonograph, to reproduce operas and other dramatic representations, is at present, to say the least, premature.

An English steamer, the *Scandia*, was recently overtaken by a terrific storm in mid-Atlantic, and the captain, having no store of oil on board which he could throw on the troubled waters, tried the effect of soapsuds, and, it is said, with the greatest success. The effect was instantaneous, the height of the waves being immediately diminished and their crests being less threatening. The captain of a French vessel is also reported to have employed soap solution with similar success. He used three kilogrammes of soap dissolved in seventy litres of water, and dropping the mixture over the bows of his ship, insured a quiet pathway for it ten yards wide.

It is reported that there is some chance of a union between the Panama and Nicaragua Canal Companies; and the proposed arrangement, including as it does a fusion of French and American interests, is regarded with favour by those most interested in the matter. Under such an arrangement the Nicaragua Company would purchase the machinery and assets generally of the Panama Company, and the construction of a canal over the Nicaragua route would be rapidly pushed forward. It is considered that only one canal is needed to accommodate the ships which are now compelled to go round Cape Horn. The notion of piercing this isthmus is a very old one, and many lives have been lost and much treasure has been expended in the endeavour to carry out the enterprise. It is certain that the work will be accomplished some day with success, and this union of the two companies which have formerly been rivals, seems a step in a forward direction.

Hitherto marine glue has been the only satisfactory cement for joining glass; it would withstand the action of water and acids, but heat would cause it to give way. It is now reported that Mr Charles Margot has produced a metallic solder for glass, consisting of ninety-five parts of tin and five of zinc, which melts at two hundred degrees, and becomes firmly adherent to that material. An alloy

of ninety parts tin and ten of aluminium melts at three hundred and ninety degrees and becomes a still stronger solder for glass. It is asserted that with these alloys it is as easy to solder two pieces of glass together as pieces of metal. Of course, certain precautions are necessary, for we all know that glass suddenly heated will inevitably crack. The pieces to be joined should be carefully heated in a furnace, and the parts to be connected rubbed with a rod of solder, and this can be then evenly distributed as it melts, with a rod of wood or paper.

Mr Arthur Stenhouse, in a letter to the *Scotsman*, describes the process of ore treatment and gold recovery in the Transvaal, by means of which at least ninety-five per cent. of the gold in the ore can be recovered, this method more than anything else having made recent gold-mining so successful. The three stages of progress are milling, concentrating, and cyaniding. As to the first process, when the rocks are hoisted out, they are sorted, the waste rock is thrown aside, while the gold-bearing ore is broken into lumps, and passes by gravitation and feeders through a battery, or stamp-mill, each stamp of which weighs about eleven hundred and fifty pounds. A stream of water is introduced, and the ore is crushed into fine sand, carried over a series of inclined copper plates, which are coated with quicksilver. The free gold in the sand amalgamates with the quicksilver, and the sand-laden stream continues its course, and passes on to the concentrators, which retain the heavy sand, while the lighter passes to the cyanide vats. A solution of cyanide of potassium is pumped into these sand vats, which dissolves the gold, leaving pure sand alone in the vat. This gold solution, after it leaves the vat, being led into a series of boxes filled with zinc shavings, the gold separates from the liquid, and settles on the zinc shavings in the shape of a small black powder.

In the battery, the copper plates are scraped daily, and the quicksilver and gold is weighed and placed in the safe. The quicksilver is afterwards evaporated, and the gold residue smelted into bars. The 'concentrates' are usually roasted, so that iron may be separated from the gold. The gold from the zinc shavings is also recovered by retorting, the produce when melted being known as 'cyanide gold.'

A curious calculation with reference to the power exerted by, and the life of, big guns, is given in a recent number of the *Scientific American*. The Italian 100-ton gun (model of 1879), with a charge of five hundred and fifty pounds of powder, ejects an enormous projectile at an initial velocity of 1715 feet per second, which is equal to seventeen million horse-power exerted for about the hundredth part of a second. Modern guns give to their projectiles an initial velocity of just upon two thousand feet per second, equal, when the weight of the ball is taken into consideration, to twenty-four million horse-power exerted for the same time. But, unfortunately, after a few of these gigantic efforts the constitution of the 'infants' is undermined; the ephemera are longer lived in comparison, for whereas those

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active organisms have at least a summer day's life, the big gun has lived out its allotted span after the time required for the discharge of about one hundred shots.

Asbestos wool, compressed by the hydraulic pump to a thin sheet and waterproofed on one side, is recommended by an American inventor for the middle soles of boots and shoes. It is said that such a compound sole will protect the wearer from all the ills which are supposed to be associated with the access of heat, cold, and moisture to the feet.

Lord Armstrong has recently made some very curious photo-electrical experiments by means of a Winshurst machine. This machine is caused to charge two large condensing jars, and the brush discharge from these latter, just before the tension rises sufficiently to produce an actual spark, is made to impinge upon a very sensitive gelatine plate. The operation is conducted in a dark room, and in the absence of either camera or lens, but the result on each plate employed is a most beautiful arborescent pattern, which is varied in each picture by modifying the conditions of the discharge. Very beautiful effects are also produced by using a simple plate of glass which, after being waxed, is covered with a very delicate layer of fine dust; by the action of the discharge, this dust is made to assume various curious figures. It is well known that Nature endows the lowliest organisms with most perfect form and intricate adornment, but it is curious to note that beauty of design should accompany even the phenomena connected with a discharge of electricity.

The United States Navy Department has recently adopted a form of machine gun which is known as the Colt Automatic, and it is made by the Colt Company of Hartford, Conn. It stands on a tripod, and has a weight of only forty pounds, so that a horseman can carry it in a boot behind his saddle, and even a bicyclist can mount one without much difficulty. This gun will give a continuous fire of four hundred shots per minute for an indefinite time, and in a recent test for accuracy, at two hundred yards, made one hundred hits on a target the size of a man, in sixteen seconds. The cartridges are fed to the gun by a belt, and any kind of ammunition may be used. The expansion of gas during one discharge works the necessary mechanism for the next.

The *British Medical Journal* lately reminded its readers that while micro-organisms are the great producers of disease, dust is the great medium by which those organisms are carried from place to place. The housemaid in sweeping a carpet, especially when she kneels down to do so with a short brush, is stirring up this dust to the detriment of every one in the house, and breathing germ-laden particles to her own destruction. If carpets must be used—and they are unhealthy things at the best—a patent sweeper should be used with plenty of damp tea leaves. What is much better than carpet is a floor-covering like linoleum which can be wiped with a damp cloth; this is far healthier than any fabric which can hold in its meshes microbe-bearing dust.

The demand for wood-pulp by the paper

factories is now so great that, to meet it, the destruction of timber is positively alarming. It is said that the *Petit Journal* of Paris—we do not know why this particular newspaper should be picked out for illustration—consumes paper which is equivalent to the annual sacrifice of one hundred and twenty thousand trees, or a clearance of twenty-five thousand acres of timber land. If this be true of a single journal, it is difficult to imagine how the demands of all the others can possibly be satisfied except on the supposition that many other kinds of fibre beyond that afforded by wood are being requisitioned by the paper-maker. It is believed that within a few years the growth of timber to supply the needs of literature will be quite as important as its production for constructive purposes. It is perhaps a fortunate thing that iron and concrete are so rapidly usurping the place of wood as building materials.

'PADDY'S' WIFE.

By JOHN MACKIE.

Author of *The Devil's Playground* and *Sinners Twain*.

CHAPTER I.

Mislike me not for my complexion,
The shadow'd livery of the burnish'd sun,
Merchant of Venice.

FOUR riders, each one leading a packhorse, had come to a swollen, swift-flowing river in the Never-Never country of the Carpentarian Gulf, and prepared to cross.

A blackfellow called 'Paddy' was the first to plunge his horses into the flood and successfully accomplish the passage. A white stockman called Clements was the next to land safely on the other side. Then a black gin named Katie, wife of the aforesaid 'Paddy,' urged her horses into the tawny-crested waters as fearlessly as either the latter or the stockman had done. But the packhorse was heavily burdened, so in mid-stream it suddenly took fright, reared, pawed the water wildly, and went round in a circle. Katie, who was like a fish in the water, released her grip on the mane of her riding horse, leaving it to reach the opposite bank by itself. With one powerful side-stroke she swam in upon the struggling, overburdened animal; caught and clung to its long mane on the off side, and tried to guide it to the opposite shore. The sound of her voice and her prompt action quietened the brute, when suddenly catching sight of a drifting log, which it probably mistook for an alligator, it reared and lashed out again with its fore-feet. Then an unshod hoof struck the black woman on the head, and her body drifted down with the current.

In another minute, however, Alec Paterson the squatter, who was the last of the party to essay the swim, had ridden his horses into the river; left them in mid-stream to finish the journey by themselves, and swam down hand over hand to where the gin had disappeared. He dived once, twice, three times; at last he caught sight of the woman as she came to the surface, and caught her before she sank again. He was a strong swimmer, so in a few minutes had towed his burden to the opposite shore, and laid it on the bank. The

first thing he did was to restore respiration by artificial means. The next, when he saw that the woman was regaining consciousness, was to call on the stockman pretty sharply to continue the process, while he—Alec Paterson—went up to the black husband 'Paddy,' who had been watching the entire proceedings with an air of apathetic unconcern, and surprised that worthy by pulling him off his horse, and kicking him soundly. Alec Paterson never did anything by halves.

'You cold-blooded villain,' he said, with a notion of frightening Paddy, 'I've a good mind to take Katie from you.'

'Humph!' snorted the blackfellow contemptuously, 'me no care s'posed' you do that; plenty more sit down alonga bush.'

Just then, however, Katie regained consciousness; heard her lord's chivalrous speech; saw him trying to dodge Mr Paterson's boot a second time, and smiled despite her sick and dazed condition.

CHAPTER II.

Alec Paterson was the pioneer of that wild Never-Never country which lay between the salt-pans and the ranges to the west of the one hundred and thirty-eighth degree of eastern longitude. As yet his nearest white neighbour was in Queensland, some fifty miles distant; moreover, the mountain blacks, and those that infested the mangrove-fringed rivers on the low-lying northern seaboard, marked their disapproval of his presence by occasionally spearing his cattle and horses, cutting the fencing wire to make spear-heads with, and otherwise annoying him. But, still, as Alec Paterson said, they were a cowardly lot at the best, for they always carefully avoided coming in contact with the whites. It was therefore not an unnatural thing that in time Alec Paterson and his stockmen began to hold their enemies somewhat cheap, and to neglect those precautions the disregard of which has cost so many settlers in wild new countries their lives.

Alec Paterson had married the cultured daughter of a well-to-do Sydney merchant in '81, some two years previous to his coming up to the Gulf country. He had left her behind in Brisbane, until such time as he could get ready a fitting home for her in the land of promise he was going to; but when he first saw it his heart sank within him. However, during his spare time he and his men built a rough but comfortable dwelling-house; and then he wrote her to say that as there was not a white woman within a hundred and fifty miles of them, he could not think of bringing her to such a place. But Mrs Paterson was not to be put off like this, so within two months she and her child had arrived at Burketown in Queensland, where the maid-servant she had brought with her promptly accepted the best of four offers of marriage she received within as many days of her arrival, and became the wife of the principal storekeeper. But Mrs Paterson was not easily discouraged, and so a few weeks found her with her husband upon the cattle station.

When Alec Paterson looked at the dainty, delicate figure of his wife, and then around at

the crude attempts at carpentering which characterised their sitting-room, he bit his lip with a sense of mortification. How could he have been such a fool as to suppose that a girl who had been accustomed to every luxury could exist in such a Crusoe's cave? This was surely what they called a man's selfishness.

'However you're to exist, my dear, in a place like this, without another white woman, I don't know. I'm sorry I didn't send you back with the next boat when at Burketown. It was just like me not to think of it sooner.'

But she only laughed at him.

'Nonsense,' she said; 'it's a capital little house; what with the roll of calico we brought with us, you won't know it for the same place in another fortnight. This is just the sort of thing I always had a fancy for. If you could only manage to let one of those black women come over and help me a little every day, until I get things straight, I should be perfectly happy. Your Chinaman, Sue Lee, is an excellent cook, and upon the whole I think we'll get along very well.'

Paddy's wife, Katie, was no Venus when judged by the white man's standard of beauty—she was black but not comely. Still that did not prevent her evincing something more than mere respect for the only man who was not afraid to kick the arch-tyrant Paddy. Her ethics were based upon the simple doctrine that it was as well to do unto others as they did by you. When Mrs Paterson arrived at the station, beyond a furtive series of peeps, born of an irresistible curiosity in regard to the outward appearance of the 'white Mary,' Katie had shown a decided disposition to sulk. Afterwards when Mr Paterson with awakened interest pondered over whatever associations he had with her, he remembered that, previous to his going to Burketown to fetch up his wife and child, he had told Katie of his purpose, expressing the hope that she would welcome the white sister and endeavour to be of some use to her. Whereupon the black woman, who had been seated on the ground sharpening a 'yam-stick' by the aid of a piece of broken glass, rose to her feet, looked at him in an incomprehensible way, and marched off in evident dudgeon, somewhat mystifying the simple-minded young squatter.

It was only when Mrs Paterson with the child in her arms went over to Katie's hut in Paddy's absence, that she succeeded in overcoming the black woman's evident antipathy to her.

When the white woman had entered the tiny bark hut, which was innocent of doors or window-frames, she found the black gin squatted on a rug spread on the clay floor; she was evidently brooding over something, and did not seem to notice her visitor. The expression on her face was not inviting; indeed, some would have hesitated before addressing her. But Mrs Paterson was equal to the occasion.

'Katie,' she said pleasantly, in that peculiar pigeon-English used between blacks and whites, 'you come look out this-one white picaninny.'

And going over to where the gin sat with sullen averted face, she knelt down beside her, holding out the white-faced child, whose big blue eyes, so like its father's, seemed to stare so wonderingly upon the world. Katie stopped

short in the 'baal budgerie' of pettishness that rose to her lips, and the look of anger on her face gave way to one of curiosity. The child crowded and shot out his fat little arms towards her. With an inarticulate cry of pleasure and tenderness Katie clasped her hands together, while her plain face became beautiful with the light that shone upon it.

Alec Paterson had often been filled with wonder to witness the solicitude which those wife-beating blacks displayed towards their dogs; but he was hardly prepared for the devotion which the savage woman exhibited for the white child. Katie, indeed, had become a changed creature. She would bustle around the house all day, making herself useful, in order that she might be allowed to nurse the child for a few minutes. When Alec Paterson saw that Paddy's domestic comfort was suffering in consequence, he spoke to his wife.

'My dear,' he said, 'you must really try and do with less of Katie, or some fine day you'll find that she has disappeared into the bush and taken something with her.'

This frightened the mother; but when one day Paddy, without any warning whatever, flung off the livery of a hateful civilisation, and cast in his lot with the neighbouring blacks, leaving his wife behind him, Mrs Paterson's sympathy for Katie was aroused and her faith in her restored.

But Alec Paterson only remarked, 'I wouldn't wonder if that beggar Paddy's up to some mischief. I'd advise you to keep an eye on the gin, and see that she has no communication with the outside blacks—that's the secret of half the massacres.'

CHAPTER III.

The blacks had been killing cattle at the south end of the run, and the squatter was obliged to go off in a hurry, leaving Clements the stockman and the Chinaman cook to keep an eye on the station, and those in it who were dear to him, in his absence.

Mrs Paterson sat under the bark roof of the veranda, while the child, resting in a hammock, with Katie bending and crooning over it, were alongside her. The glaring intensity of the fierce sunlight had begun to soften as the shadows crept towards the east. Suddenly a strange bird called from a thicket of golden wattle. Katie started when she heard it, and then crooned on as before. In a few minutes the strange bird called again. Then the black woman yawned with a delightful absence of restraint, and remarked: 'Me plenty tired now, missis. Thinkit me go alonga hut.'

But when Katie left she did not enter the hut; she only sauntered round by the back of the house, and stole off into the bush like a shadow. And there was no one to connect her disappearance with the cry of that wild bird.

Night, and the white mother with the child by her side lying in the partially darkened room, while outside the thousand and one voices of the tropical night created a strange medley of sound.

With a cat-like stealth a shadowy figure

crept into the room, approached the bedside of the sleepers, and paused a minute as if irresolute. It was Katie the black gin. Through the shutterless casement a broad shaft of subdued light streamed into the room, throwing the woman and child into relief. For a minute the face of the black woman darkened as she looked upon the face of the sleeping mother. But in another moment she had looked upon the sleeping child, who only a few hours before had cried with delight as he threw out his chubby little arms, and looked up trustingly into her dark face.

'Missis, Missis,' cried the gin impulsively, shaking the sleeper with something almost like fierceness. 'S—sh! Get up—get up—you put'm on dress and come 'longa me.'

'Katie!' cried Mrs Paterson, in no little alarm as she awakened out of her sleep, and with a dawning sense of the horrible truth, 'what is the matter? Is it the?'

'Myall (wild) blackfellow come up alonga station in the morning. You come where blackfellow no find'm you. Quick—put'm on cloes.'

The black gin led the white woman, who carried the child in her arms, out by a back way, and then in cover of a clump of bushes into the forest. Mrs Paterson had wanted to warn the others in the station, but Katie insisted on having her own way. 'Blackfellow no come up till morning,' she explained; 'after a little bit me leave'm you, and then me go back tell'm alonga station.'

Up the sandy tortuous bed of a dry creek the black woman led the white. Soon they had reached the mountain-side, and entered a little gully shrouded by a wealth of feather-palms and tree-ferns.

'You stop here till me come again,' said the dusky daughter of the woods, as, stooping down, she lifted one of the rounded little hands of the child and pressed it against her cheek. Then like some spirit of the night she disappeared noiselessly.

CHAPTER IV.

It is the darkest hour in all the twenty-four, which precedes the one when the pale lemon glow struggles into the eastern sky, and the voices of the night cease. Already the scattered buildings of the cattle station loom up mysteriously to an abnormal size; but there is nothing to hint at the tragedy which overshadows it.

In the paddock, slowly advancing on the station buildings, a large number of wicked-looking blacks flit from tree to tree as noiselessly and, seemingly, as unsubstantial as shadows. In their hands are cruel barbed spears and other weapons. And now as they approach nearer the squatter's house, some of them get down on their hands and knees, while others lie flat on their faces, and wriggle along like snakes. At last some of the bolder spirits actually stand under the veranda of the dwelling-house.

For a second or two they pause to listen, but nothing save the foolish croak of a belated frog down by the creek disturbs the stillness. Suddenly three little jets of light, like blood-red flashes of fire, spurt from loopholes in the side of the slab-built house, and a hideous roar

echoes through the woods—a strange heralding for the tropical dawn. At the same moment, three savages drop to earth like pole-axed bullocks. Katie had kept her word; she had gone back to the station and given the alarm.

Then a grim little siege began; the besieged being a white man, a Chinaman, and a black woman. Time and again did the savages try to rush the house; but the stockman's Winchester did deadly work, and Sue Lee's double-barrelled fowling-piece, loaded with slugs, was something to be reckoned with. But the blacks were evidently bent on extermination, and kept pressing on from behind. It was only a question of time with the little garrison. And then as the bright-eyed goddess of the morn fared forth, and the sun as if on tip-toe peeped over the tree-tops, a hissing, crackling, ruddy shaft of flame shot up from the bark roof of the doomed house. The grimed and hard-pressed three could not stand the terrible heat much longer. *Crash!* down came a ponderous tie-beam and a sheet of bark from the roof, sending a shower of sparks in all directions. How peacefully the blue sky looked down upon them through that fire-fringed rent!

Then the Christian white man, the disciple of Confucius, and the heathen woman, knew that the time was come when they must needs leave the burning house, and go outside to face what Fate might have in store for them. And it would have been hard to decide, judging by appearances, which of them went out to face the problem of eternity most readily.

When Alec Paterson and his men rode down upon the station a few hours later, they found only the little storehouse intact amid the smoking ruins of the other buildings. When the three hard-pressed ones had been driven from the burning dwelling-house, they had fought their way to it, and there made a final and effectual stand. The blacks, at last despairing of dislodging them, had taken themselves off, carrying with them most of their dead and wounded. Clements, the white stockman, now sat outside, propped up with his back to the wall, and his rifle resting across his knees. There was a spear wound in his right leg, and another in his left shoulder. With care he might pull through. As for poor Sue Lee, he now knew more than any white philosopher, for he had solved the great mystery. And as for Katie, the black gin, she knelt outside on the ground, pillowing the head of a dead savage upon her knees, and wailing over him. This savage was her old lord and tyrant, the arch-traitor Paddy. The spear wound in her side, that even now made her feel faint, had been dealt by him.

The squatter, who was afraid to ask Clements as to his wife and child when he saw the smouldering ruins of his home, rushed into the storehouse with a horrible fear in his heart. But there was no wife and child there—only, across the doorway, the body of Sue Lee with that look of contentment on his face.

In another moment the squatter feared the very worst. Like one who is beside himself with grief, he rushed outside, seized the gin by the arm, and pressed the muzzle of his revolver against

her cheek: 'Where are my wife and child?' he cried; 'where are they, you she-devil?'

The gin lifted her head and looked him boldly, scornfully in the eyes. 'Shoot, you fool!' she said by way of reply. 'You thinkit me like that? You thinkit black gin baal (is not) all a-same white Mary?'

He took the weapon from her cheek. 'When I think of it now, you didn't seem to take to her,' he said, 'and why, your own black heart only knows. But we'll drag the truth from you.'

He had not realised as yet—though he was soon to do so—that human nature as exemplified by the feminine mind is the same all the world over, and that nobility of soul may exist inside a black skin as well as under a white one.

When they tied her hands together, and made her walk in front of them for fear of treachery, she neither resisted nor murmured. Probably they had not guessed the reason of her faltering steps, as with a set and apathetic expression on her face she led them to the little gully in the mountain-side. Had they dreamt of the fact that a barbed spear-head was buried in her side, they would surely have acted differently. And there in that secluded spot, where the feathery fronds of palms meeting over their heads shut out the blue of heaven, the squatter found his wife and child waiting for him unharmed.

When Alec Paterson turned from them to their dark-skinned guide, it was too late; for Paddy's spear and the forced march had done their work, and she had gone to where her proud spirit would be better understood.

HOPE.

If thou art absent there is nought that cheers,

For life without thee hath no promise fair,

And love without thee is a lifelong care,

The certain pledge of agony and tears:

But thou hast magic to assuage my fears,

For thou art strong to battle with Despair,

And thou alone canst help a man to bear

The mournful silence of his lonely years.

Stay with me, angel of a better life

That I shall live when dream is shaped in deed;

Stay till I reap the harvest of the seed

Sown now love's passions and love's fears are rife;

And when I doubt the truth of love's blind creed,

Tell me the end is worthy all the strife.

PERCY GALLARD.

* * TO CONTRIBUTORS.

1st. All communications should be addressed to the 'Editor, 339 High Street, Edinburgh.'

2d. For its return in case of ineligibility, postage-stamps should accompany every manuscript.

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